Docket No.: MSFT-0307/150575.1
Inventors: Nicholas P. Wilt
Filing Date: Sept. 21, 2001   **S/N:** Not yet assigned
Title: System and Methods for Providing Histogram Computation in a High Precision Rasterization Data Pipeline
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135a

110b

135b

Computing Device 110c

Computing Device 110a

Computing Device

135c

14

Computing Device 110d

Communications Network

Computing Device 110e
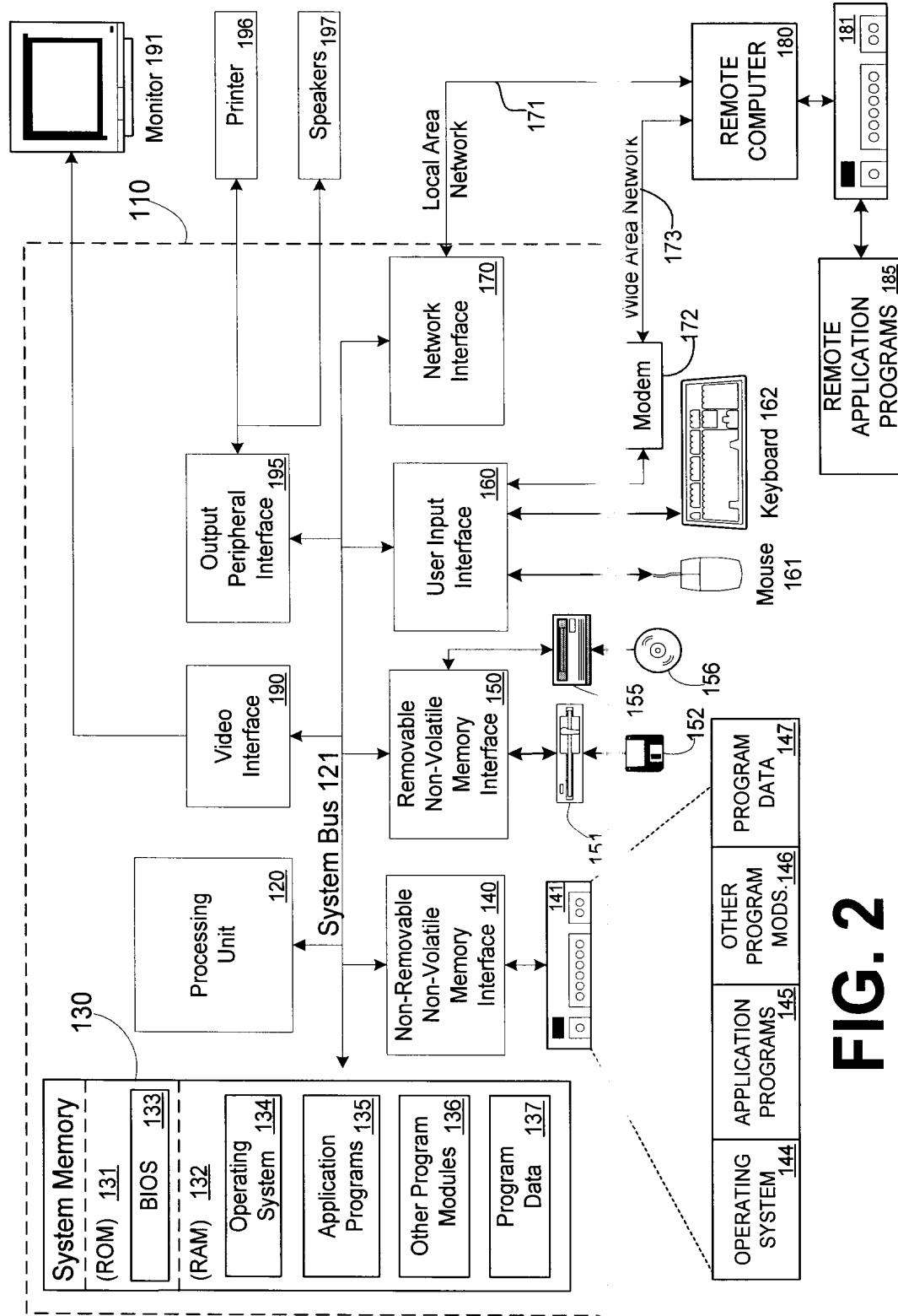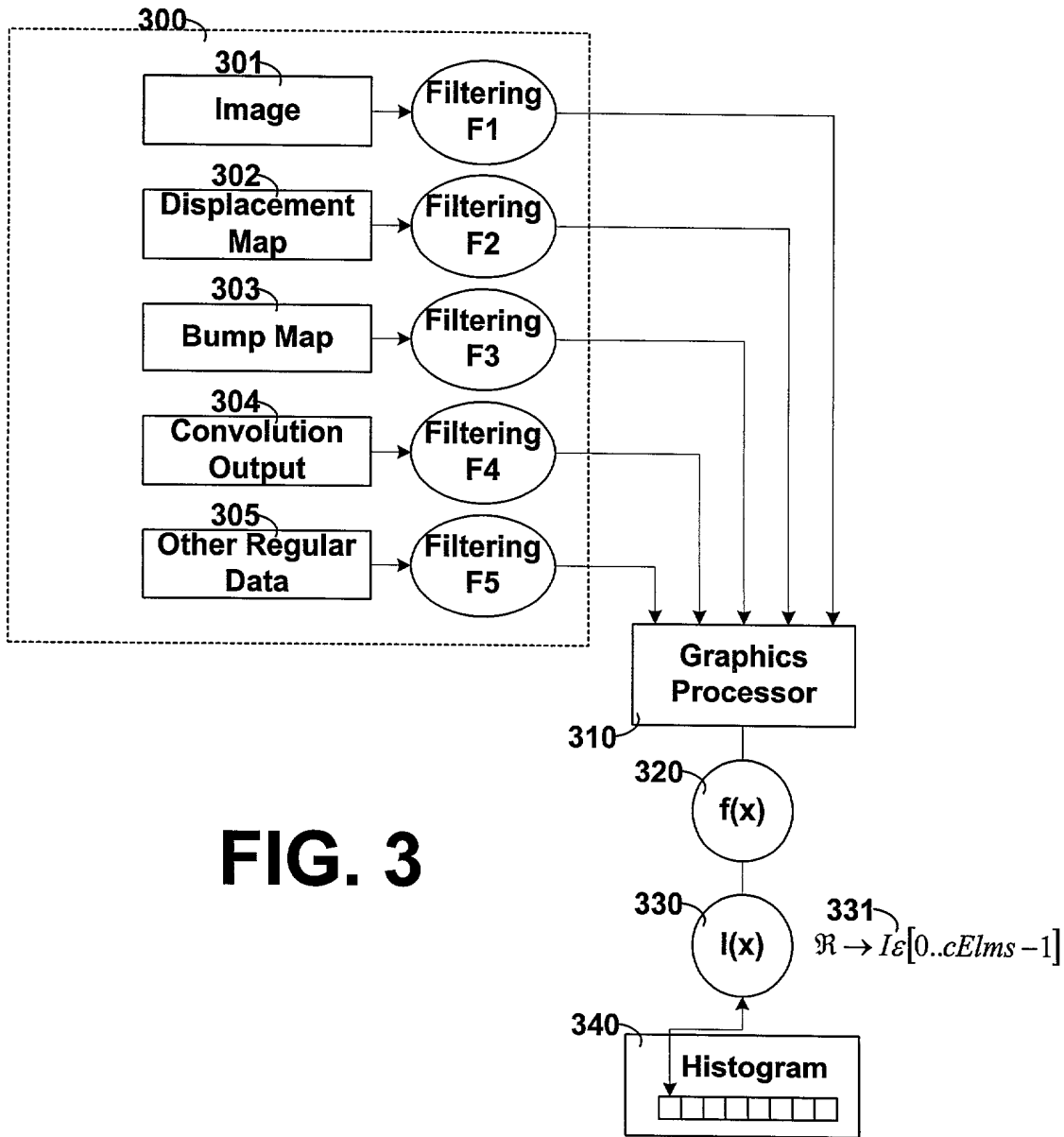
FIG. 1

135d

135e

10b

10a

Server

Server

Database 20

Computing Environment 100

FIG. 2

OPERATING SYSTEM 144	APPLICATION PROGRAMS 145	OTHER PROGRAM MODS. 146	PROGRAM DATA 147

System Memory 130

System Memory 131
- (ROM) 131
  - BIOS 133
- (RAM) 132
  - Operating System 134
  - Application Programs 135
  - Other Program Modules 136
  - Program Data 137

Processing Unit 120

System Bus 121

Non-Removable Non-Volatile Memory Interface 140

Removable Non-Volatile Memory Interface 150

Video Interface 190

Output Peripheral Interface 195

User Input Interface 160

Network Interface 170

Monitor 191

Printer 196

Speakers 197

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REMOTE APPLICATION PROGRAMS 185

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300

301
Image → Filtering F1

302
Displacement Map → Filtering F2

303
Bump Map → Filtering F3

304
Convolution Output → Filtering F4

305
Other Regular Data → Filtering F5

Graphics Processor
310

320 f(x)

330 I(x)

331 $\Re \rightarrow I\varepsilon[0..cElms-1]$

340

Histogram

FIG. 3

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400

405

```
HRESULT ResetHistogram();    410

HRESULT SetHistogramState( D3DHISTSTATE StateToSet, DWORD dwStateValue );

typedef enum _D3DHISTSTATETYPE        415
{
        D3DHIST_SIZE,            // number of elements in the histogram
                                 // actual count is 2 more for below-min and above-max
        D3DHIST_FMIN,            // (float)
        D3DHIST_FMAX,            // (float)
        D3DHIST_FUNCTION         // function to map fragment to histogram element index
} D3DHISTSTATETYPE;
```

FIG. 4

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500

```
//
// Different ways to histogram a fragment color
//
#define D3DHISTFUNCTION_R        1
#define D3DHISTFUNCTION_G        2
#define D3DHISTFUNCTION_B        3
#define D3DHISTFUNCTION_A        4
#define D3DHISTFUNCTION_YUVY     5
#define D3DHISTFUNCTION_YUVU     6
#define D3DHISTFUNCTION_YUVV     7
```

FIG. 5